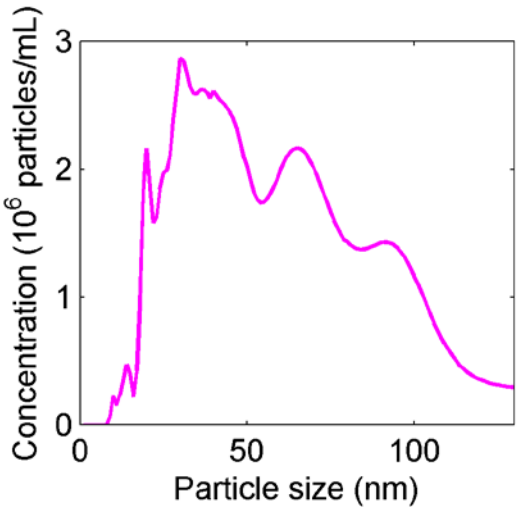
Supplementary Information



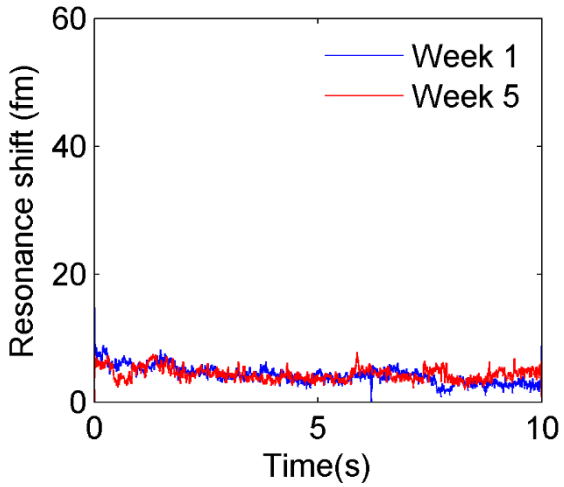
SFig1. Nanoparticle tracking analysis (NTA) corresponding to sample shown in Figure 4. There is a general broad peak corresponding to particles 30-50 nm in diameter, which is similar to the ~44 nm vesicle size we report with FLOWER; however, there are also two peaks of larger particle size. In contrast to FLOWER, NTA does not have antibody-functionalization for specific exosome detection. Based on our results we expect particles of a larger size found in the Nanosight do not specifically bind to the toroid and do not represent the specific exosomes we are trying to detect.

Dielectric factor (D) calculation:

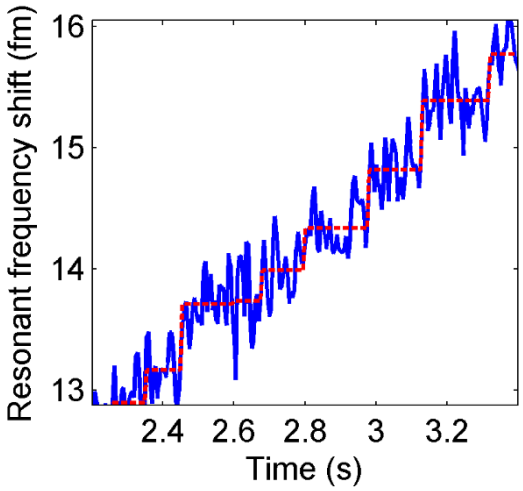
Our dielectric factor is defined as:

$$D = \frac{4\pi n_m^2 \left(n_p^2 - n_m^2\right)}{\left(n_p^2 + 2n_m^2\right)}$$

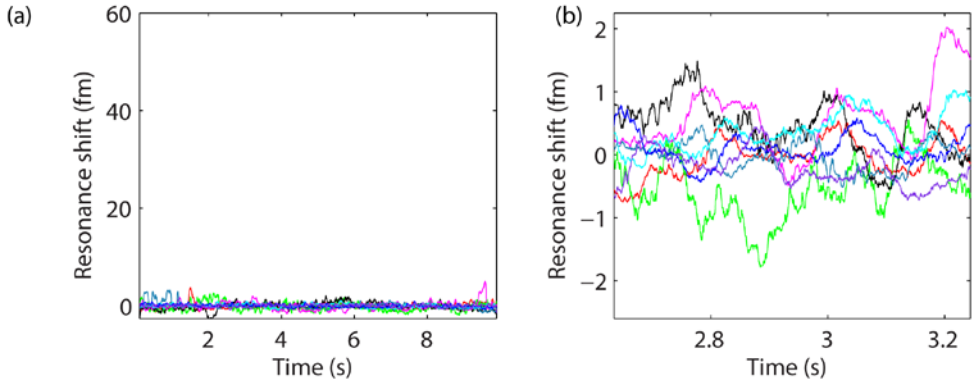
where n_m is the index of refraction of the surrounding media, and n_p is the index refraction of the particle. Using 1.375 as the index of refraction of an exosome, and 1.33 for the index of refraction of the surrounding media, we calculate a $D \cong 0.5$.



SFig2. Resonance wavelength as a function of time for serum from a mouse with no palpable tumor. Serum from a mouse with no tumor taken from week 5 does not generate a larger signal than serum taken from week 1. This is in contrast to samples taken from mice containing tumors that are analyzed using FLOWER.



SFig3. Zoom-in of week 4 (Figure 2). Discrete steps may also be observed upon zooming in on week 4 (Figure 2).



SFig4. Control performed with an antibody other than anti-CD81. (a) Resonance wavelength as a function of time for the same serum shown in Fig. 4a flowed over a resonator functionalized with monoclonal anti-tobacco mosaic virus (TMV) instead of anti-CD81 (nine traces). (b) A closer look at a region from (a). No permanent binding steps of exosome-sized particles are observed.